The Envelopes That Bear the First Writing

DENISE SCHMANDT-BESSERAT

Many scholars have conceived of the invention of writing as an "instantaneous," "unprepared" phenomenon, a "leap" in human cultural development.[1] In other publications I have proposed that, against those expectations, writing was preceded and prepared by a more archaic recording system using tokens.[2] The striking similarity between the shape of the tokens and that of the first written signs shows that the first scribes transposed in a more convenient sign form the symbolism developed in the previous abacus. After a short review of the token system for readers unfamiliar with the topic, I will turn to an entirely new chapter in my research and present *envelopes* that secured tokens of special transactions (fig. 1). The aim of the paper is to present the first comprehensive documentation on the clay envelopes. The interest of the study is twofold: (1) markings found on the envelopes represent the precise beginning of the technology of writing, and (2) the analysis of groups of tokens held inside the envelopes decodes the meaning of major types of tokens.

A Recording System Based on Tokens

Tokens appear in archaeological assemblages of the ancient Middle East starting around 8500 B.C.[3] They are made of clay; modeled into

DR. SCHMANDT-BESSERAT is assistant professor of art in the Center for Middle Eastern Studies, University of Texas at Austin. Research for this paper was supported by a grant from the National Endowment for the Humanities. The author would like to acknowledge the cooperation and assistance of Pierre Amiet, Musée du Louvre, Paris; Thomas C. Barger and Norah M. Barger, La Jolla, Calif; Ali Hakemi, Musée Iran Bastan, Teheran; Mahmoud Heretani, Aleppo Museum; Helene J. Kantor, Oriental Institute, University of Chicago; Ernest Lacheman, Wellesley College; C. C. Lamberg-Karlovsky, Peabody Museum, Harvard University; Shukri Sahuri, Amman, Jordan; and Eva Strommenger, Museum für Vor- und Frühgeschichte, Berlin. She also wishes to thank M. W. Green, Associate Director, Project Archäische Texte aus Uruk, for reading and commenting on the manuscript; Marjorie Irwin; Madeleine Clarke; and Ellen Simmons, for drawing the figures.

[1]Jacques Derrida, *De la grammatologie* (Paris, 1967), p. 176.

[2]Denise Schmandt-Besserat, "The Earliest Precursor of Writing," *Scientific American* 238 (1978): 50–59; "An Archaic Recording System and the Origin of Writing," *Syro-Mesopotamian Studies* 1, no. 2 (1977): 1–32.

[3]Denise Schmandt-Besserat, "The Earliest Uses of Clay in Anatolia," *Anatolian Studies* 27 (1977): 133–50; "The Earliest Uses of Clay in Syria," *Expedition* 19, no. 3 (1977):

 0040-165X/80/2103-0001$01.00

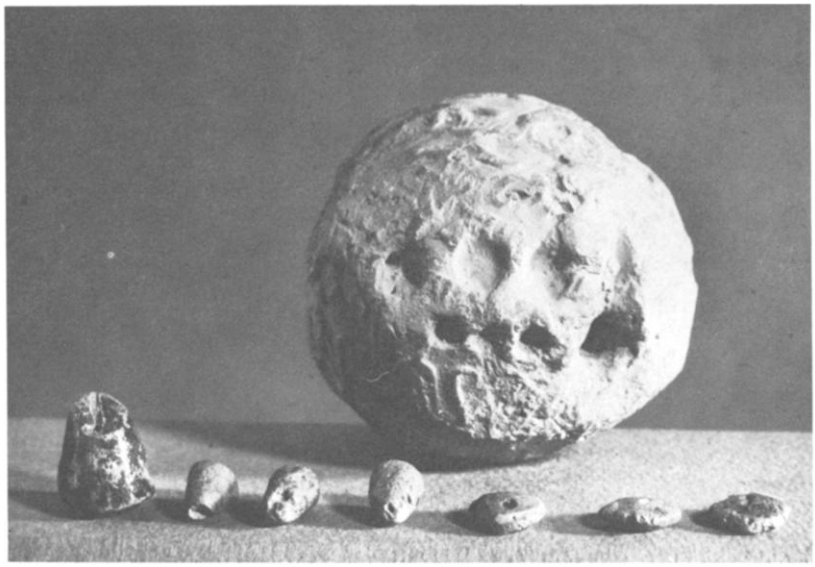

FIG. 1.—Envelopes and tokens from Susa, Iran. (Courtesy of the Musée du Louvre, Département des antiquités orientales.)

various shapes, mostly geometric, including spheres, discs, cones, tetrahedrons, cylinders, rectangles, triangles, and ovoids; and sometimes bear incised and punched markings (fig. 2). We may assume that the tokens represent the elaboration of pebble counting.[4] They were a better memory aid, as the various distinctive shapes and markings stood for specific commodities.

At the emergence of cities, about 3500 B.C., the token system underwent profound changes.[5] The evolution is expressed by a proliferation of markings on the faces of the tokens, which seem to indicate the necessity of recording an increasing variety of goods. About 3500–3200 B.C., the clay envelopes appear that are the particular focus of this paper.

Discovery of the Envelopes

The first clay envelopes were excavated in Susa. It is not clear if they were recovered by Jacques de Morgan in 1901, when he first

---

28–42; "The Beginnings of the Use of Clay in Zagros," *Expedition* 16, no. 2 (1974): 11–17; "Reckoning before Writing," *Archaeology* 32, no. 3 (1979): 22–31.

[4]Karl Menninger, *Number Words and Number Symbols* (Cambridge, Mass., 1977), p. 301.

[5]Denise Schmandt-Besserat, "An Archaic Recording System in the Uruk-Jemdet Nasr Period," *American Journal of Archaeology* 83, no. 1 (1979): 19–48.

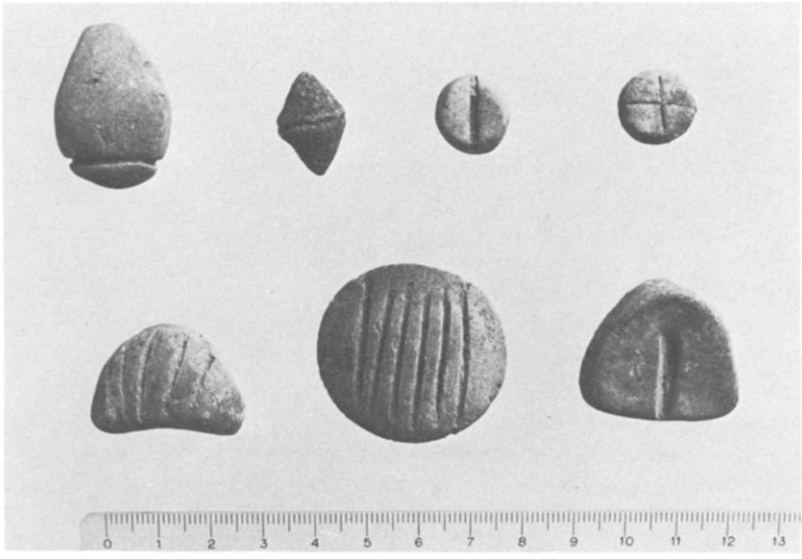

FIG. 2.—Tokens from Susa, Iran. (Courtesy of the Musée du Louvre, Département des antiquités orientales.)

reached their stratum, or by Roland de Mecquenem in 1907. The discovery, at any rate, did not attract much attention at the time, and it was not recorded in any of the Susa reports until a vague comment by V. Scheil some fifteen years later.[6] It was Leon Legrain who first devoted his interest to the artifacts and, in particular, to the well-preserved seal impressions that they bear in the vigorous style of the Uruk period. The envelopes first appear in the literature in Legrain's "Empreintes de cachets élamites," published in 1921 under the heading "bulles sphériques," meaning "spherical sealed documents" (English "bulla," pl. "bullae").[7] The name proved unfortunate because it incorporated the envelopes into the broad category of "bullae," which, although related in appearance (made of clay, same size range, covered with seal impressions), have altogether a different function. Legrain seems never to have realized that the "spherical bullae" were hollow and held tokens, while the ovoid, diamond-shaped, pyramidal bullae are sealings holding the strings of bundles of merchandise. Legrain even went so far as to describe the "spherical bullae" as bearing traces of strings, which, to my knowledge, do not occur on any specimen.

[6]V. Scheil, "Textes de comptabilité protoélamite (nouvelle série)," *Mémoires de la délégation en Perse* 17 (1923): 1.

[7]Leon Legrain, "Empreintes de cachets élamites," *Mémoires de la mission archéologique de Perse* 16 (1921): 7–8, fig. 298.

Further envelopes were found in Susa during the 1923–24 excavation season directed by Roland de Mecquenem. This time the "boules de terre crue" did not pass unnoticed, and twelve lines of the report published in *Revue d'Assyriologie* are devoted to them. For the first time mention is made that the objects are hollow, rattle when shaken and contain small tokens in various forms including "grains, cones, pyramides, pastilles."[8] However, de Mecquenem perpetuated Legrain's error in viewing the envelopes as sealings for bundles of goods and interpreted the tokens as signatures of manufacturers responsible for the shipment.

In the 1920s, an isolated clay envelope was recovered in the Hurrian level of the second millennium at Nuzi, northern Iraq.[9] Egg-shaped and hollow, the envelope contained forty-eight tokens. Its surface, inscribed in cuneiform writing, bore a list of forty-eight animals including twenty-one ewes, six female lambs, four male lambs, eight rams, six she-goats, one he-goat, and two kids. In 1959 A. Leo Oppenheim deduced from this artifact that a recording system based on tokens was used as a complement of written bookkeeping at the palace of Nuzi.[10]

Following Oppenheim's publication, Pierre Amiet could, in 1965, identify the Susa envelopes as accounting devices—"pièces de comptabilité." It is also to him that we owe the identification of the tokens as representing goods and commodities.[11] Both these insights and major contributions constitute the basis of the present study. Amiet published and analyzed all the envelopes excavated at Susa by the French expedition under Morgan and Mecquenem, thus making all the material available for study. He hypothesized that the envelopes might have been used as bills of lading accompanying shipments of merchandise from centers of production in the country to administrative centers in the cities.

My own contribution since 1974 has been to document that tokens, such as those found in the envelopes, were found loose in most sites of the ancient Middle East. I proposed that they were part of a recording system commonly used prior to writing. By tracing the earliest tokens to the incipient farming communities of the ninth millennium B.C., I

[8]Roland de Mecquenem, "Fouilles de Suse (campagnes 1923–24)," *Revue d'Assyriologie et d'archéologie orientale* 21, no. 3 (1924): 106–7.

[9]Ernest R. Lacheman, *Excavations at Nuzi,* vol. 7, *Economic and Social Documents,* Harvard Semitic Series, vol. 16 (Cambridge, Mass., 1958), p. 88, tablet 311 (2096).

[10]A. Leo Oppenheim, "On an Operational Device in Mesopotamian Bureaucracy," *Journal of Near Eastern Studies* 18 (1959): 121–28.

[11]Pierre Amiet, "Il y a 5000 ans les Elamites inventaient l'écriture," *Archeologia* 12 (1966): 20–22; also P. Amiet, *Glyptique Susienne: Mémoires de la délégation archéologique en Iran,* vol. 43, pts. 1, 2 (1972), hereafter cited as *Glyptique.*

provided a link between the need for and invention of recording and the beginning of agriculture. I was able to draw parallels between the shape of the tokens and those of the first signs of writing and to point out the relationship and continuity between the two recording systems.

Geographic Distribution

Since the discoveries of Susa and Nuzi, further clay envelopes have been recovered. The total number presently known is about 130 specimens and seventy fragments, originating from ten sites scattered over a wide area of the Middle East. The map illustrating the distribution of the envelopes stretches from the fringe of the desert Lut in southern Iran (Shah Dad) and Saudi Arabia (Dharan), to Israel (Hebron) and northern Syria (Habuba Kabira), and indicates a definite concentration in Iran, which may only be due to chance of excavation (see fig. 3).

In the present estimate, about 100 complete envelopes and seventy fragments come from Iran, representing 85 percent of the total number. There are forty complete and fifteen fragmentary envelopes, as well as fifty-seven fragments, in Susa.[12] The second exca-

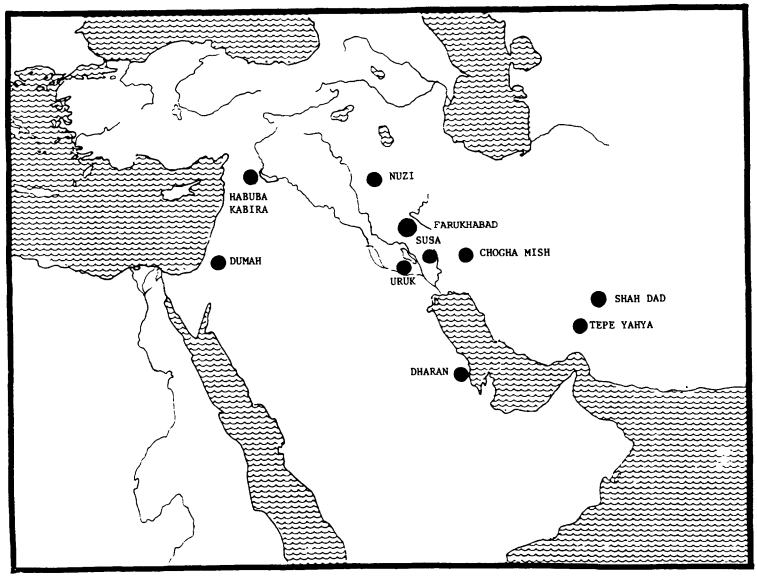

FIG. 3.—The geographic distribution of clay envelopes found in the Middle East

[12](a) Stored at the Louvre, Département des antiquités orientales: complete specimens: Sb 1926, Sb 1927, Sb 1928, Sb 1929, Sb 1930, Sb 1931, Sb 1932, Sb 1933, Sb 1934, Sb 1935, Sb 1936, Sb 1937, Sb 1938, Sb 1940, Sb 1941, Sb 1942, Sb 1946, Sb 4838,

vation campaign at Chogha Mish produced eight complete envelopes, and during the third season a hoard of over twenty was unearthed, plus an undisclosed number of single specimens as well as numerous fragments.[13] There are one in Farukhabad,[14] one in Tepe Yahya,[15] and one in Shah Dad.[16] Irag is second with twenty-six specimens, twenty-five coming from Uruk[17] and one from Nuzi.[18] In Syria two were found at Habuba Kabira.[19] In Israel, the unique specimen presently located was purchased on the antiquity market by Shucri Sahuri, a private collector.[20] The envelope was part of a lot of two which was said to originate from the site of Dumah, near Hebron. A single

---

Sb 5310, Sb 6295, Sb 6312, Sb 6946, Sb 6947; fragmentary: Sb 1944, Sb 1948, Sb 1949, Sb 1967, Sb 1974, Sb 5340, Sb 6294, Sb 6350, no reference—1; fragments: Sb 1939, Sb 1939 bis, Sb 1940, Sb 1940 bis, Sb 1941 bis, Sb 1947, Sb 1950, Sb 1951, Sb 1952, Sb 1956, Sb 1957, Sb 1959, Sb 1960, Sb 1961, Sb 1962, Sb 1964, Sb 1965, Sb 1966, Sb 1968, Sb 1969, Sb 1971, Sb 1973, Sb 1975, Sb 1976, Sb 1977, Sb 1978, Sb 1979, Sb 1980, Sb 1981, Sb 1982, Sb 1983, Sb 1984, Sb 1985, Sb 1986, Sb 1987, Sb 1988, Sb 1991, Sb 2122, Sb 2178, Sb 2182, Sb 2274, Sb 2276, Sb 3070, Sb 4852, Sb 5308, Sb 5418, Sb 5419, Sb 5875, Sb 6308, Sb 6949, Sb 7841. (*b*) Stored at the Iran Bastan Museum, Teheran: complete specimens: MT 759 (35), no reference—fragments: MT 759 (26), MT 759 (33), MT 759 (34), MT 759 (36). All of the above are published in Amiet, *Glyptique*. (*c*) Stored at Susa: complete specimens: S ACR 1.77.2049.1, 2089.1, 2111.3, 2119.1, 2127.1, 2130.1, 2130.2, 2142.3, 2162.1; fragmentary: S ACR 1.77.1999.1, 2067.2, 2111.2, 2130.4, 2142.2, 2173.4; fragments: ACR 1.77.2111.1, 2162.2; published in Alain le Brun and Francois Vallat, "L'Origine de l'écriture à Suse," *Cahiers de la délégation archéologique française en Iran* 8 (1978): 15–18.

[13]Pinhas P. Delougaz and Helene J. Kantor, "New Evidence for the Prehistoric and Protoliterate Culture Development of Khuzestan," in *5th International Congress of Iranian Art and Archaeology* (Teheran, 1968), 1:27.

[14]Henry T. Wright, "A Consideration in Interregional Exchange in Greater Mesopotamia," in *Social Exchange and Interaction,* ed. Edwin N. Wilmsen (Ann Arbor, Mich., 1972), p. 104.

[15]The envelope is stored at the Peabody Museum, Harvard University. It is published in Denise Schmandt-Besserat, *The First Civilization: The Legacy of Sumer* (exhibition catalog) (Austin, Tex., 1975), pp. 51, 53.

[16]The envelope is stored at the Musée Iran Bastan, Teheran. Ali Hakemi, *Catalogue de l'Exposition, Lut. Shahdad "Xabis"* (Teheran, 1973), p. 20, item 54 and pl. 22A.

[17]The envelopes are stored at the Iraq Museum, Baghdad. Heinrich J. Lenzen, *XXI vorläufiger Bericht über die von dem deutschen archäologischen Institut und des deutschen Orient-Gesellschaft aus Mitteln der deutschen Forschungsgemeinschaft unternommenen Ausgrabungen, in Uruk-Warka* (Berlin, 1965), pp. 30–32 and pls. 17–19, hereafter cited as UVB.

[18]See Lacheman (n. 9 above).

[19]The two envelopes are stored at the Aleppo Museum in Syria. Eva Strommenger, "Ausgrabungen in Habuba Kabira und Mumbaqat," *Archiv für Orientforschung* 24 (1973): 170–71.

[20]The envelope is kept in the collection of Mr. Shucri Sahuri, Amman, Jordan.

envelope was found in Saudi Arabia, near the airport of Dharan,[21] by Norah M. Barger.

It should be added here, for the sake of completeness, that about forty hollow clay balls were reported found at Abydos in Egypt. Although their appearance is much the same as the Middle Eastern envelopes, they may well be an altogether different kind of artifact.[22]

Manufacture

The envelopes are generally spherical, with an average diameter of 5–7 cm and with specimens as small as 3 cm and as large as 9 cm. The Nuzi envelope has an egg shape. Two specimens from Susa,[23] those from Tepe Yahya and Dumah, have a pronounced football shape with pointed ends.

Eight envelopes from Susa have a small area flattened by scratching or chipping the surface when the clay had already hardened, to allow the artifacts to stand more securely and prevent them from rolling.[24]

Seven specimens, again from Susa, have been pierced while the clay was still moist with a remarkably thin tool such as a metal pin.[25] The perforations pierce through the wall, entering the envelope obliquely and reemerging a few centimeters farther along the surface. In one specimen the perforation does not even penetrate the inner cavity.[26] The meaning of such openings is not obvious because the hole could not house a tie thicker than a thread and the contour of the holes does not exhibit traces of wear.

The envelopes are made of fine clay which seems unprepared. The paste of a single specimen from Susa exhibits pitting, which could suggest the use of a fine vegetable temper.[27] Analysis of the clay of the envelope of Tepe Yahya revealed that it was not of local origin.[28]

Although the tokens usually rattle when the envelopes are shaken, they are quite tightly tucked together in the cavity. Mecquenem had hypothesized that the tokens were wrapped in textile before being covered with clay, as the envelope had to be compact enough to bear the pressure of the imprint of a seal.[29] None of the specimens that I

[21]The specimen is kept in the collection of Mr. Thomas C. Barger, La Jolla, Calif.

[22]T. Eric Peet, "A Remarkable Burial Custom at the Old Kingdom," *Journal of Egyptian Archaeology* 2 (1915): 8–9.

[23]S ACR 1.77.2089.1, 2130.1.

[24]Sb 1928, Sb 1929, Sb 1930, Sb 1933, Sb 4838, Sb 5310, Sb 6312, Sb 6947.

[25]Sb 1928, Sb 1929, Sb 1936, Sb 1944, Sb 1950, Sb 1956, Sb 1978.

[26]Sb 1950.

[27]Ibid.

[28]Personal communication from C. C. Lamberg-Karlovsky.

[29]De Mecquenem (n. 8 above), p. 107.

have handled, however, showed any trace of cloth inside. The walls of the clay envelope are very thick, ranging between 1.5 and 2.5 cm (fig. 4). It seems that the cavity to hold the tokens were prepared by pushing two or three fingers inside a ball of clay. Impressions of fingertips are, in some cases, still visible against the inner surface.

At Sharafabad,[30] as well as at Tepe Gawra,[31] small clay cups have been found which could pass for prefabricated half-envelopes easy to fit together by plastering. None of the identified envelopes seems, however, to have been prepared in that fashion. The X-ray photograph of the Dharan example seems to indicate the overlap of a patch of clay applied to close the opening.

The red brick color of both envelopes from Dharan and Shah Dad had made me suspect that at least some of the specimens were fired. This could explain how these two particular examples, which were found on the surface, could have suffered weathering for an unknown period of time. The fact that all envelopes can easily be opened with a knife, however, speaks against firing. It is also noteworthy that the paste of the envelopes does not show any color variation, but a plain uniform tone throughout the thickness.

Chronology

The earliest envelope securely dated is that of Farukhabad, which appears in a Middle Uruk level estimated to about 3500–3300 B.C.[32] At Chogha Mish the envelopes are estimated to belong to the early phases of the so-called Protoliterate period, about 3300 B.C.[33] At Uruk the envelopes were found in level IV, which represents the last level of the Uruk period and is dated about 3200–3100 B.C.[34] At Susa they appear at a depth of 18 m, which corresponds to the period of Susa Ca, exactly contemporary with Uruk IV.[35] The envelopes of Habuba Kabira are also believed to date from the end of the fourth millennium B.C.

Early Bronze Age I sites dated about 3100–2850 B.C. are known in

[30]Henry T. Wright and Gregory A. Johnson, "Population, Exchange, and Early State Formation in Southwestern Iran," *American Anthropologist* 77, no. 2 (1975): 271.

[31]A 31 52 92, A 31, 52 93. Both cups are stored at the University Museum, University of Pennsylvania, Philadelphia. To my knowledge they are not published.

[32]Wright (n. 14 above), p. 104.

[33]Delougaz and Kantor (n. 13 above), p. 27. Also Helene J. Kantor and Pinhas P. Delougaz, "New Light on the Emergence of Civilization in the Near East," *UNESCO Courier* (November 1969), p. 23.

[34]Edith Porada, "The Relative Chronology of Mesopotamia," in *Chronologies in Old World Archaeology,* ed. Robert W. Ehrich (Chicago, 1965), p. 176.

[35]Louis Le Breton, "The Early Periods at Susa, Mesopotamian Relations," *Iraq* 19, pt. 2 (1957): 104–5.

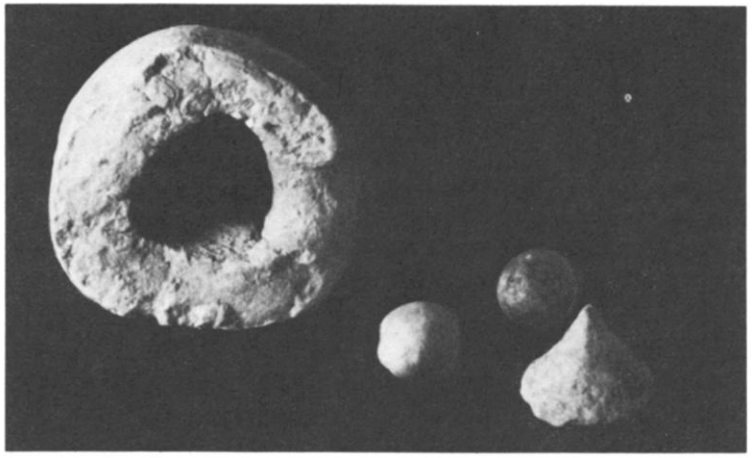

FIG. 4.—Envelope and tokens from Tepe Yahya, Iran. (Courtesy of the Peabody Museum, Harvard University.)

the area of Hebron where the Dumah example is said to originate. There is, however, no evidence that the object came from their context.

The envelope from Tepe Yahya came from level VI B2, dated to about 2800–2600 B.C.[36] It seems appropriate tentatively to date the specimen from the neighboring site of Shah Dad,[37] and possibly that of Dharan, to the same period.

The Nuzi envelope is of a much later period, as it belongs to the Hurrian levels of the middle of the second millennium B.C.

The still scanty evidence concerning the chronology of the envelopes demonstrates one important fact: namely, that these artifacts were used for an extended period of time, starting in the fourth millennium B.C. and continuing until the second millennium, well after writing was used in all parts of the Middle East.

The Sealings

It is probable that from the beginning of their use, tokens of specific accounts were kept in special containers. Except for rare occasions when tokens have been found enclosed in clay[38] or metal vessels,[39]

[36]Personal communication from C. C. Lamberg-Karlovsky.

[37]The envelope was a surface find. Hakemi (n. 16 above) dates it from the second half of the fourth millennium B.C.

[38]Tokens were enclosed in the "vase à la cachette" in Susa. Personal communication from Pierre Amiet. Sb 2723 (24).

[39]Kate C. Lefferts, "Technical Examination," *Metropolitan Museum Journal* 3 (1970): pp. 16–17.

FIG. 5.—Envelope bearing a seal impression, from Susa, Iran. (Courtesy of the Musée du Louvre, Département des antiquités orientales.)

they are often lying on the floors of houses, suggesting that the containers were perishable. One may expect, for instance, that they were held in wooden boxes, baskets, or pouches of skin or cloth which would have disintegrated.

The invention of the envelopes seems to have been stimulated by the need to confer an official character on certain transactions by the means of seals. All envelopes found in the major administrative centers (Uruk, Susa, Chogha Mish, Habuba Kabira, and Nuzi) were covered with seal impressions (fig. 5). Among the more peripheral sites, only the Shah Dad example bears a plain ring-shaped stamp sealing, while the envelopes from Tepe Yahya, Dharan, and Dumah are smooth. As a rule, a single cylinder seal is rolled several times around the envelope with the evident intent of covering the entire surface to

prevent any tampering with the content. In some cases the cylinder seal has been rolled first around the maximum diameter of the envelope and subsequently in a vague herringbone pattern covering both hemispheres. At Shah Dad, it is a stamp seal that is repeated around the entire surface. One example in Uruk and fifteen in Susa, including a number of fragments, bear the imprints of two different seals, consisting of two cylinders or a stamp and a cylinder.[40] The use of three seals on an envelope also occurs twice at Susa and once in Habuba Kabira. In one instance there are three cylinders; in the other, two cylinders and a stamp.[41]

According to Pierre Amiet, who has carried out a complete analysis of the seal impressions on the Susa envelopes, the themes illustrated are numerous, and among them feature rosettes, animals such as rams, goats, and cattle arranged in file, and fabulous monsters in heraldic postures. Humans are depicted busy in workshops or in the process of filling granaries; the high priest or king is represented, as well as a hero mastering snakes.[42] All these motifs could be assumed to be of religious or mythological character and may point to temple administration, while others, featuring scenes of war such as bound prisoners and besieged cities with people begging for mercy,[43] may suggest the notion of the state.

The Tokens Enclosed in Envelopes

The main interest of the envelopes resides in the tokens they contain. In most cases, as they are well protected by the thick clay walls, the only indication of their presence inside is the gentle rattle they produce when the envelope is shaken. A number of envelopes, including ten in Susa, several in Chogha Mish, and two in Habuba Kabira, have been found crushed by the weight of the debris accumulated upon them but still holding their full or partial content of tokens.[44] A restricted number of envelopes have been opened by

[40]Uruk: W.20 987, 6. Susa: the seal impressions are published in Amiet, *Glyptique* (G.S.) (n. 11 above). Sb 1926, G.S. 683 and 549; Sb 1931, G.S. 550 and 552; Sb 1932, G.S. 581 and 598; Sb 1934, G.S. 596 and 470; Sb 1936, G.S. 467 and 594; Sb 1937, G.S. 574 and 465; Sb 1941, G.S. 566 and 579; Sb 1967, G.S. 488 and 668; SB 4838, G.S. 565 and 553; Sb 4852, G.S. 682 and 687; Sb 5340, G.S. 694 and 664; MT 759 (35), G.S. 672 and 595; S ACR 1.77.2089.1; S ACR 1.77.2111.3; S ACR 1.77.2119.1. Stamp and cylinder: Susa: Sb 1948, G.S. 456 and 655.

[41]Sb 6294, G.S. 548, 586, 697. Habuba Kabira: M11 134; Sb 1942, G.S. 460, 557, 577.

[42]Amiet, *Glyptique* (n. 11 above).

[43]Delougaz and Kantor (n. 13 above), p. 32, pl. Xd.

[44]Chogha Mish: ibid., p. 27, pl. IXa. Habuba Kabira: MII 133, MII 134. Susa: Sb 1967, Sb 5340, Sb 6350, no reference; S ACR 1.77:1999.1, 2067.2, 2111.2, 2130.4; 2142.2, 2173.4.

various methods (fig. 6). Openings were practiced in eleven specimens from Susa, allowing the tokens to be freed.[45] At Tepe Yahya the pointed end of the football-shaped envelope was carefully sawn open. The Nuzi envelope was also opened, but in this case, unfortunately, the tokens were separated and lost.

The technique of tomography, which can produce X-ray pictures of predetermined plane sections inside an object, may prove to be the ideal solution for the study of the envelopes. Normal X-rays have been used, with unsatisfactory results, to investigate several specimens from Chogha Mish,[46] as well as the envelopes from both Dharan (fig. 7) and Dumah. The tokens are tightly clustered and hide one another, thus preventing an exact count. It is also difficult to decide if a spherical shape is a sphere or a disc, and it is not possible to determine whether the tokens bear incised or punched markings.

The present number of envelopes whose content is known with absolute certainty amounts to no more than thirteen (fig. 6), which represent a mere 5.3 percent of the total number. The number of tokens found in these specimens totals 115. Another thirteen envelopes found broken but holding a full or partial content and four isolated groups of tokens found separated from their envelopes[47] bring the total number of tokens associated with envelopes to 281. There is an average of ten tokens per envelope, but in reality there are great discrepancies, as that of Nuzi yielded forty-eight, while others had as few as two.

The tokens enclosed in the envelopes are identical in shapes and markings to those found at large, except that those enclosed in envelopes are sometimes smaller, ranging between 7 and 15 mm, compared with 10–30 mm. The manufacture is also cursorily performed, perhaps in the presence of the parties involved, while the tokens found at large are made with great care and are fired.

Ten types of tokens are represented among the 281 tokens found within envelopes: seventy-three spheres, fifty-nine cylinders, twenty-one discs, twenty-two tetrahedrons, twelve cones, seven ovoids, seven parabolae, two triangles, two vessels, and two barrel-shaped.

Spheres, cones, and tetrahedrons are featured in two different sizes. Discs appear with slanting, straight, and high sides. Cones, tetrahedrons, ovoids, and tokens in the shape of containers bear the usual incised and punched markings, bringing the number of subtypes to nineteen (fig. 8).

[45]S ACR 1.77:2049.1, 2089.1, 2111.3, 2130.1, 2142.3.

[46]Delougaz and Kantor (n. 11 above), p. 27.

[47]Susa: S ACR 1.77:2067.3, 2091.2; no reference—1. Uruk: W20 98727.

	SPHERES	large	DISCS	pellets	high	CONES	large	punched	TETRAHEDRONS	large	punched	OVOIDS	incised	CYLINDERS	TRIANGLES	PARABOLLAE	VESSELS	MISCELLANEOUS	UNDETERMINED	TOTAL	MARKINGS
Nuzi																			48	48	
Susa																					
Sb 1927				3		3	1													7	7
Sb 1938	3				1				1			1				1				7	
Sb 1940				3										3						6	6
Sb 1942	2																			2	
Sb 1946	1		1																	2	
Sb 6946	6																			6	
ACR 2049.1														3						3	3
ACR 2089.1	7													3						10	
ACR 2111.3														6						6	6
ACR 2130.1														7						7	7
ACR 2142.3	3													5						8	8
Tepe Yahya	2					1														3	3
TOTAL	24		1	6	1	4	1		1			1		27		1			48	115	

FIG. 6.—Tokens included in envelopes found complete

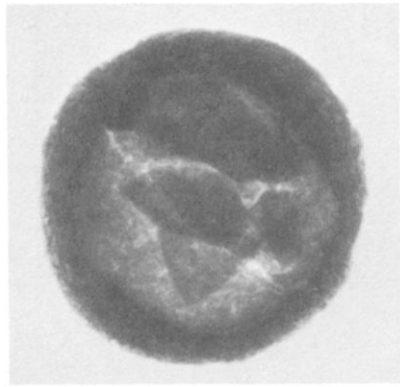

FIG. 7.—X-ray photograph of the envelope from Dharan, Saudi Arabia

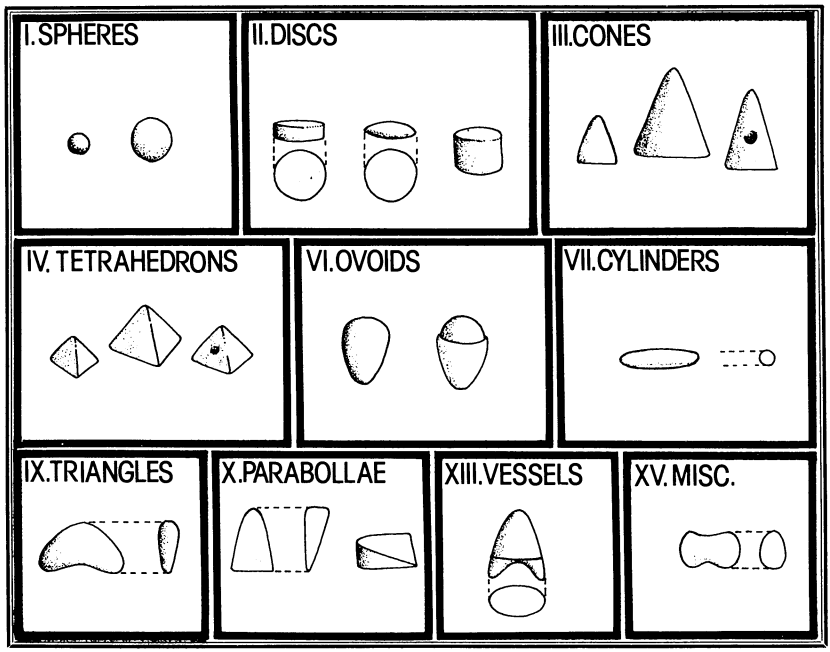

FIG. 8.—Shapes of tokens found within envelopes

Interpretation

The envelopes found in Iraq, Syria, Palestine, Saudi Arabia, and Iran exhibit a remarkable similarity in material, manufacture, shape, and size. The examples from Tepe Yahya, Dharan, and Dumah share the peculiarity of bearing no sealings. The content of all envelopes is also highly similar. Even with the very limited sampling of opened

envelopes, it seems evident that all major types of tokens found at large in sites of the early Urban period are found included in the envelopes. It is interesting to note that all cylinders come from Susa and that Habuba Kabira produced only incised ovoids, which indicates, as could be expected, a specialization per site or even per building. The homogeneity of the group of artifacts strongly suggests that they all served an identical function and that the messages contained in the form of tokens were intelligible from Elam to Palestine.

What were the messages? What is the meaning of the spheres, cones, discs, cylinders, tetrahedrons, and many other shapes of tokens? The most obvious key to their understanding lies in epigraphy. As stated in the introduction, the earliest repertory of signs perpetuated the symbolism developed in the token system. Each sign was in fact the pictograph of a token.[48] Unfortunately few pictographs are presently deciphered. The usual method of deciphering pictographs is to trace the evolution of their shapes through 500 years to the cuneiform signs of the third millennium B.C., which are generally understood. As the evolution of signs is capricious, it is often not possible to do so, and most of the pictographs remain enigmatic.

Two further methods will be used here to try to interpret the token system: analysis of the groupings of tokens inside the envelopes, which obviously conveyed meaningful information, and morphology.

1. *Quantities are indicated by the repetition of the units of accounts.*—The Nuzi envelope housed forty-eight tokens to represent the forty-eight animals stipulated in the inscription: twenty-one ewes, six female lambs, four male lambs, eight rams, six she-goats, one he-goat, and two kids. The Nuzi envelope, therefore, demonstrates that each token stood for one animal of a particular kind and that the tokens had a one-to-one correspondence. The same principle applies for the envelopes of the fourth millenium B.C., and in particular those of Habuba Kabira, which contained tokens of a single type (incised ovoids) repeated many times. We may thus conclude that the shape of the tokens indicated the nature of the commodities involved, and that the quantity was expressed by the number of units represented.

2. *The spheres, cones, and triangles are metrological units for grain.*—Spheres of small and large sizes are included in fifteen out of thirty envelopes. Seventy-three spheres represent 25.6 percent of the total number of tokens. Twelve cones in two different sizes, including one example bearing a punched marking, are divided among eight envelopes. Both cones and spheres are consistently predominant in as-

[48]M. W. Green and Denise Schmandt-Besserat, "Appendix II," *American Journal of Archaeology* 83, no. 1 (1979): 41–48.

semblages of tokens found at large. Following Falkenstein's reading of the conical and circular signs as numerical notations,[49] I had proposed in previous publications to consider the small cone as standing for the number 1 and the small sphere for 10, the large cone for 60 and the large sphere for 3,600. In the light of the above discussion, I presently believe that all tokens enclosed in evelopes are units of accounts of particular commodities, and I am inclined to think that Thureau Dangin and Langdon were correct in interpreting the conical and circular markings as metrological units used specifically for grain.[50] I therefore postulate that the isosceles cones and the spheres stand for units of barley. In a recent study of the early Sumerian and Proto-Elamite metrological system, Jöran Friberg was able to demonstrate that in both cultures the two units of grain measurements most commonly used were represented by a conical and a circular sign,[51] which appear to be the representation of a cone and a sphere. The cone is the smaller unit of the two and probably corresponds to what we know in later times as the *ban.* The circle seems to correspond to the later Sumerian *barriga,* which is six times larger than the ban. A fraction of the ban was represented by a plain triangle, and multiples of the ban and barriga are represented by larger cones and spheres, as shown in figure 9. This interpretation is supported by the fact that barley was a common medium of exchange in the ancient Middle East and was involved in most economic transactions.

3. *The cones and spheres stand also for units of land measurement.—*

FIG. 9.—Tokens used as metrological units for grain. Drawn after Jöran Friberg, *The Third Millennium Roots of Babylonian Mathematics,* pt. 1, *A Method for the Decipherment, through Mathematical and Metrological Analysis, of Proto-Sumerian and Proto-Sumerian and Proto-Elamite Semi-pictographic Inscriptions* (Göteborg, 1978–79), pp. 10, 20.

[49]Adam Falkenstein, *Archäische Texte aus Uruk* (Berlin, 1936), p. 49.

[50]François Thureau Dangin, "Notes assyriologiques," *Revue d'Assyriologie et d'archéologie orientale* 29, no. 1 (1932): 23.

[51]Jöran Friberg, *The Third Millennium Roots of Babylonian Mathematics,* pt. 1, *A Method for the Decipherment, through Mathematical and Metrological Analysis, of Proto-Sumerian and Proto-Elamite Semi-pictographic Inscriptions* (Göteborg, 1978–79), pp. 10, 20. Friberg refers to the signs as "cups" and "discs."

Traditionally, land measurements from Sumer[52] to the Mycene[53] have been calculated in terms of seed ratio necessary for sowing. It is therefore not surprising to find in Friberg's study that the symbols used for grain metrology are used with little change for area measures.[54] The series of land area units includes a conical mark, a punched conical mark, a circle, and a punched circle, which stand for units probably equivalent to the later *iku* and *bur* and their multiples, as shown in figure 10. As a consequence, it seems logical to assume that, in the context of land measurements, the cones and spheres would represent area units. Punched cones and punched spheres may have been used specifically for area measurements alone.

4. *The cylinders and discs are units for animal accounting.*—Morphology may be of help in deciphering the meaning of the plain discs, which are the third shape most frequently enclosed in the envelopes. A series of discs with distinctive patterns of incised lines on one face can be matched with pictographs translated as: sheep, ewe, lamb, wool, cloth, and garment.[55] It is striking that commodities of closely related meanings, such as small animals of various breeds, sexes, and ages, and their products used in the weaver's craft (fig. 11) are represented by a disc bearing various markings. One will rightly expect that the plain disc represents a common unit of the series. The pictograph featuring a plain circle is presently translated as "slab, block, or total circle,"[56] which does not seem appropriate. Here again the work of Jöran Friberg, who identified a special accounting system used in Elam to keep track of animals, may provide the answer.[57] The sign

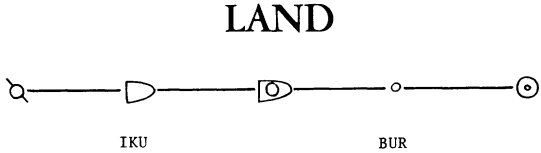

FIG. 10.—Tokens used as units of land measurement. Drawn after Friberg (see fig. 9), p. 46.

[52]Marvin A. Powell, Jr., "Sumerian Area Measures and the Alleged Decimal Substratum," *Zeitschrift für Assyriologie* 62, no. 2 (1973): 201.

[53]John Chadwick, *The Mycenaean World* (Cambridge, 1976), p. 110.

[54]Friberg, p. 46.

[55]Falkenstein, 761, 763, 803, 798, 755.

[56]Green and Schmandt-Besserat, p. 83.

[57]Friberg, p. 21.

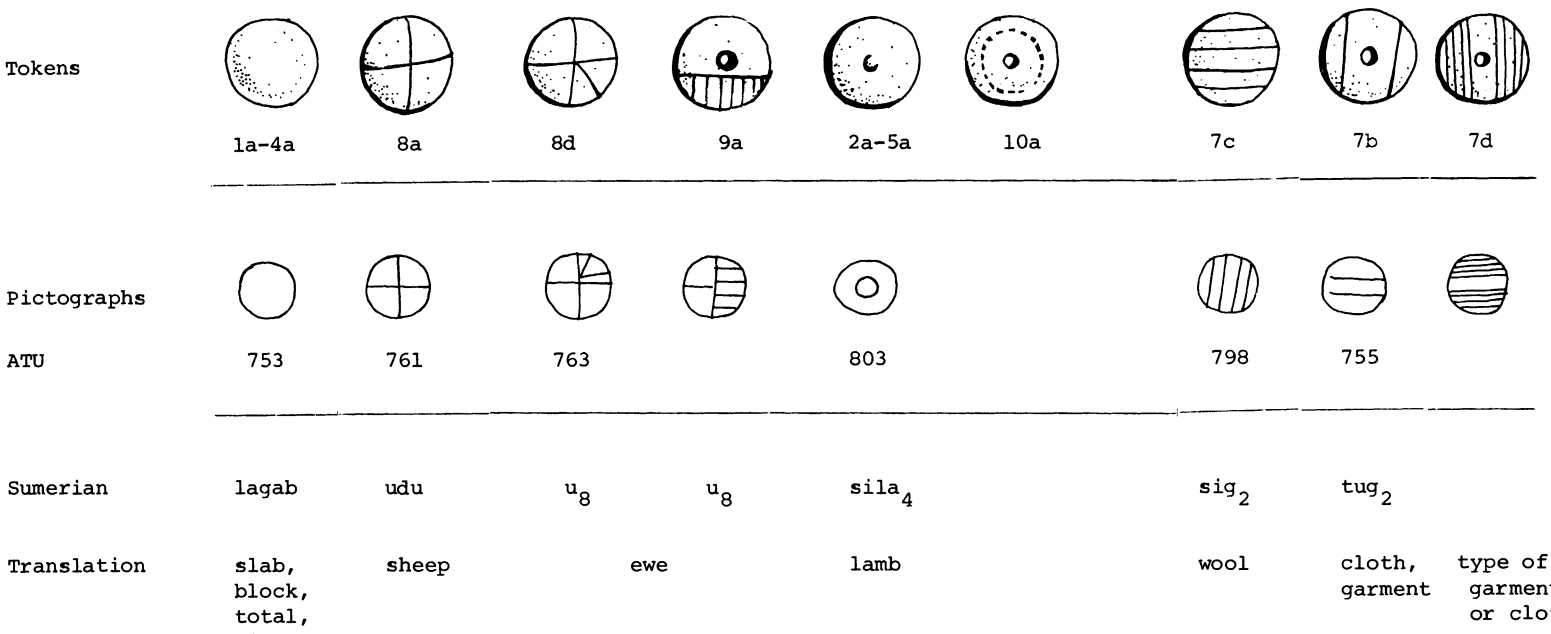

FIG. 11.—Discs used as units for animal accounting

used to represent *one* animal was a long wedge, which I propose to view as the rendering of the token in the shape of a cylinder; the sign for *ten* animals was a circle, which I interpret as the graphic representation of a disc. If this interpretation is correct, the disc is a unique example of a token expressing a collection. It could be used to count "heads" of animals with no specification of age and sex. Because the sheep was so common in the economy of Sumer and Elam, it is probable that the animals meant were sheep.

5. *The meaning of the incised ovoids.*—The ovoids with an incised line running at the maximum diameter are identical with the Uruk sign ATU 733,[58] which is translated as "oil." The tokens, which seem to depict a skin bag (fig. 8), can be presumed to stand for the goods customarily held in such a container (dates? butter? berries?).

6. *The tetrahedrons represent services.*—Tetrahedrons are the fourth type of token most frequently included within the envelopes, and they are also consistently present among the tokens found at large. A series of tetrahedrons reported in Sippar from the reign of Hammurabi (1792–1850) and described as "three-sided pyramids easily produced from a lump of clay when pressed with three fingers against a firm surface," may provide a clue to their meaning.[59] The Sippar tetrahedrons are provided with an inscription which indicates their use as wage dockets extended by a work supervisor to occasional or additional hands, and were exchanged by the workmen against a daily wage calculated in barley. The stability of the token system, demonstrated by little or no apparent evolution in the shape of the unit accounts during several millennia, would suggest the possibility that from the beginning the tetrahedron stood for a unit of services. This hypothesis is supported by the fact that an archaic sign in the form of an equilateral triangle, which can be considered as a logical graphic representation of the tetrahedron, is translated by Labat as "workman."[60] Labor was an important commodity of exchange in the ancient Middle East. Gangs of workmen digging canals, building constructions, and harvesting fields are often stipulated in contracts. It would be logical to assume that the various sizes of tetrahedrons and their markings expressed time units (i.e., one day's work, one week, one month), unless they referred to different salary rates calculated according to the size of the gangs or the complexity of the work.

[58]Falkenstein.

[59]Mogens Weitmeyer, *Some Aspects of the Hiring of Workers in the Sippar Region at the Time of Hammurabi* (Copenhagen, 1962), p. 12.

[60]René Labat, *Manuel d'épigraphie akkadienne* (Paris, 1948), pp. 204–5.

Context

At Uruk, the envelopes were found associated with Eanna, the principal sacred precinct of the city, dedicated to the Mother Goddess Inanna.[61] The Sumerians conceived their gods with human features, and as having human needs such as shelter, food, and social intercourse. The temples were considered as the earthly residences of the god or goddess to which they were dedicated. The priests and priestesses saw to it that the daily libations and meals were served to the gods and that their anointing was performed. The satisfaction of the gods was an urgent matter, as the welfare of the city was believed to be dependent on it. Each community member was expected to contribute his share of labor in the construction and maintenance of the temple; to supply gifts in kind to provide the necessary libations, meals, precious ointments, and other gifts to the gods; and to support the priesthood. Citizens had therefore to take into account in their production the gods' needs together with those of their own household. This was willingly done, as the reward was assurance of divine favor, personal prosperity, and the fulfillment of ambitions. Such temples as Eanna included not only shrines but residences for the priests, administrative buildings, special magazines to house the gifts of grains, others for fats and oils,[62] and pens and stables for the flocks and herds, whose prosperity was much celebrated by poets and artists. The temple precinct covered an extended area situated in the center of the city but separated from it by a protective wall. Successful temples such as Eanna accumulated a considerable wealth of storable goods, such as grains and herds, which could be profitably invested. These were used to pay the wages of many craftsmen[63] and, in particular, the carders, dyers, and weavers who processed the wool produced by the temple flocks into fine garments for which Sumer became famous. Grains and finished products coveted by nomads could be exchanged for raw materials brought by caravans, such as metal, timber, and stone, which had become necessary to urban life. The extent of Eanna and the display of wealth exhibited by shrines such as this vast limestone temple, which measured no less than 30 by 80 m,[64] suggest the economic importance of the temple administration in the late Uruk period. We may assume that it had full control of the labor

[61]Lenzen (n. 17 above), p. 31.

[62]Yvonne Rosengarten, *Le Régime des offrandes dans la société sumerienne* (Paris, 1960), p. 27.

[63]Ignacius J. Gelb, "The Ancient Mesopotamian Ration System," *Journal of Near Eastern Studies* 24, no. 3 (1965): 230–43.

[64]Lenzen, UVB 14 (Berlin, 1958): 34, 37, pl. 42a.

force, industry, and trade. Moreover, it regulated the production of real goods by dictating the kinds of "gifts," and their amounts, expected to be contributed to the temple by each citizen according to his wealth.[65]

The group of twenty-five Uruk envelopes was found immediately at the entrance of the Eanna precint. They lay shortly beyond the gate on the access way to the sanctuary, which was a 5-m-wide street, bordered on either side by walls provided with niches.[66] It is often noted on temple administrative records that documents, after they were no longer needed, were "broken" and discarded.[67] It is possible that the envelopes had been thrown to the street with other refuse. It is also possible that, for special reasons, the documents had been placed in the niches of the walls so as to be exhibited to the view of all passersby.

Habuba Kabira, in the Uruk period, appears as a flourishing city built as a narrow strip along the banks of the Euphrates River.[68] The settlement seemed to be wide open toward the river while heavily protected on the inland side, as if raiding by neighboring tribes was feared. A monumental fortification wall with regularly spaced projecting towers surrounded the settlement on three sides. The city was entered through two gates which led to the two temples occupying the center. A number of spacious houses were built along the main street, which stretched parallel to the river, dividing the city into two long, narrow halves. The envelopes were found in what appears to be one of the most impressive of these houses.[69] The building included a large main room flanked on either side by long rectangular rooms and opened onto a vast courtyard. Shallow hearths dug in the floors of the rooms, which show traces of cooking, suggested a domestic function for the building. The envelopes lay together with tablets and elliptical bullae in the northern part of the main room. All these artifacts, which bore seal impressions, have an obvious economic significance, and Eva Strommenger could hypothesize that the house may have been the seat of a merchant who carried on business with the Sumerian and Elamite cities situated downstream.[70]

We know little about the layout of Susa at the end of the fourth millennium B.C. except that it had reached the proportions of a large

[65]Rosengarten, pp. 83–84.

[66]Heinrich J. Lenzen, "New Discoveries at Warka in Southern Iraq," *Archeology* 17, no. 2 (1964): 127.

[67]Yvonne Rosengarten, *Le Concept sumérien de consommation dans la vie économique* (Paris, 1960), p. 221.

[68]Eva Strommenger, "Habuba Kabira am Syrischen Euphrat," *Antike Welt* 8, no. 1 (1977): 11–20.

[69]Ibid., p. 18.

[70]Ibid., p. 19.

city.[71] According to a representation shown on a sealing, the main temple, built on a terrace, was crowned with an impressive frieze of large animal horns.[72] Seventeen envelopes—or fragments thereof—were found in a building that consisted of two sets of imbricated L-shaped rooms opening onto an undefined open space.[73] Some of the envelopes were found resting on the floor while others were kept in pottery jars. In one case, an envelope was found in a small pot together with three stone tokens in the shape of discs, a shell, a spindle whorl, and a flint blade.[74] Another group found in a coarse bowl included one envelope and two tablets bearing only impressed markings.[75]

Chogha Mish also played the role of an important regional center during the Uruk period.[76] The great majority of buildings uncovered seem to be dwellings, but a polygonal platform with large projections or buttresses and the considerable number of clay cones for mosaics which have been recovered suggest the presence of a more formal architecture.[77]

Faruckhabad, located behind the first low folds of the Zagros range, in the Deh Luran plain of southwest Iran, may owe its importance to a major bitumen seepage situated in proximity to the site. It was the only small center of the area during the Uruk period. The site obviously participated in the network of exchange with the main temple centers. Although it is approximately equidistant from Uruk and Susa, the imports of basalt, lapis lazuli, and marine shells found in its assemblage indicate that its relations were directed toward Susa and the gulf, rather than Mesopotamia.[78]

Uruk in Mesopotamia, Habuba Kabira in Syria, Susa and Chogha Mish in Elam, which are separated by several hundred kilometers, share identical features in their assemblages. The four sites produced the same envelopes containing the same tokens and bearing the same sealings; they yield quantities of complex tokens modeled in exactly the same shapes and bearing identical markings; they used tablets marked with the same impressed signs; their glyptics included cylinder seals of identical shape carved with similar motifs in the same

[71]Gregory Alan Johnson, *Local Exchange and Early State Development in Southwestern Iran,* Anthropological Papers, no. 51 (Ann Arbor, Mich., 1973), p. 97.

[72]Pierre Amiet, *Elam* (Auvers sur Oise, 1966), p. 64.

[73]Le Brun and Vallat (n. 12 above), pp. 12–13.

[74]Ibid., p. 15.

[75]Ibid., p. 19.

[76]Wright and Johnson (n. 30 above), p. 282.

[77]Delougaz and Kantor (n. 13 above), pp. 26–27.

[78]Wright (n. 14 above).

style; their pottery had characteristic shapes such as crudely made beveled-rim bowls and jars with four nose-lugs, bearing the same painted, incised, and appliqué decorations.[79] One cannot help noticing that the tripartite plan of the house of Habuba Kabira is typical of Sumerian architecture.

This striking set of parallels demonstrates the existence of a strong bond connecting the four sites. The material both in Syria and Iran appears as a foreign intrusion upon the previous indigenous settlements, while it is at home in Mesopotamia. The artifacts, and in particular the complex tokens, envelopes, tablets, seals, and sealings, have an evident economic function. In this perspective, the south Mesopotamian temple system, which represents the dominant if not unique economic entity of the time, appears as the logical dynamic force to explain these recurring phenomena.[80] What role the satellite centers played in the temple system and what degree of independence they enjoyed cannot be estimated. One can, however, assume that one of their main functions was to channel toward Sumer the raw materials, such as metal from the east and stone and timber from the west, of which Mesopotamia was deprived and which were necessary for the developing urban technology.

The envelopes from Tepe Yahya, which follow four centuries later, belong to level IV B and were found outside a building in the fill of an open area.[81] The architecture of period IV witnessed the replacement of private quarters by an administrative complex. The assemblage associated with these structures included the same kinds of beveled-rim bowls and nose-lugged jars,[82] seals and sealings, envelopes, tokens, and tablets, which evidence identical activities, as those found in the fourth-millennium sites described above. The seals and sealings are, however, of a different style and bear motifs typically Elamite. Plain tokens replace the more complex forms, and the tablets are written in the evolved Proto-Elamite pictographic script. The assemblage of period IV also appears to have been brought to the site by foreigners imposing themselves on the previous Yahya culture of period V. The Mesopotamian temple can in this case not be held

[79]UVB, vol. 4, by A. V. Haller (1932), pl. 19 C.; Strommenger, p. 13, fig. 4; Alain le Brun, "Recherches stratigraphiques à l'Acropole de Suse (1969–71)," *Cahiers de la délégation archéologique française en Iran,* vol. 1 (1971), fig. 50:1.

[80]Thomas W. Beale, "Bevelled Rim Bowls and Their Implication for Change and Economic Organization in the Later Fourth Millennium B.C.," *Journal of Near Eastern Studies* 37, no. 4 (1978): 311.

[81]Personal communication from C. C. Lamberg-Karlovsky.

[82]C. C. Lamberg-Karlovsky, "Mesopotamia and the Indo-Iranian Borderlands," *Iran,* vol. 10 (1972), fig. 2 H.

responsible, but the seals, sealings, and tablets point toward the emerging Proto-Elamite civilization, which appears to have successfully adopted the temple system for its own ends.

Function

According to the few token shapes decoded, the envelopes mostly yield records of transactions dealing with grains, oil, and animals. Such goods, which could easily be stored, were used in barter in the ancient Middle East and were among the most common offerings brought to the temple. Some envelopes yielded land transactions, while others dealt with services. The amounts involved were generally minimal: the quantities of barley, for instance, ranged from 1 protoban to a few barrigas, with an occasional account reaching 24–30 barrigas. The number of sheep varies from one to fifty, with the majority of accounts dealing with three to seven animals. The maximum number of oil jars yet encountered is six. The envelope dealing with land measurement can tentatively be read as 4⅓ bur. The amount of labor meant by the units of service cannot yet be estimated.

The location of Habuba Kabira, Susa, and Chogha Mish on access routes to important sources of raw materials suggests that economic records found in their assemblages could be related to long-distance trade. However, not only do tokens involved seem to deal mostly with foodstuff, but the amounts stipulated seem far too small to be considered as exchange for expensive materials such as metal ingots, timber, stone, or precious stones.

The domestic character reported for the buildings in which most of the envelopes were found could suggest that the transactions were private contracts. One could, for instance, speculate that they were loan agreements. According to third-millennium sources,[83] a most usual kind of loan was the borrowing of barley for the planting season. These contracts were made in the presence of several witnesses, which could provide a good explanation for the multiple sealings. The agreements stipulated the reimbursement of the grain with an interest of 20–40 percent and also often included payment in labor during the harvest.

Land sales, house sales, and farming leases could also be considered as viable possibilities. We know that in later times such contracts were drawn up in the temple in the presence of the gods.[84] In this case, the

[83]Edouard Cuq, "Le Droit élamite d'après les actes juridiques de Suse," *Revue d'Assyriologie et d'archéologie orientale* 29, no. 4 (1932): 160.

[84]Ibid., p. 164.

tokens would express the amount of goods paid in exchange for the acquired or leased property, and the sealings would be the warrant of receipt by the owner/vendor.

While these explanations remain plausible, it appears that they should rather be viewed as possible secondary developments. The initial and primary function of the envelopes must certainly be sought in the temple administration, which conferred on the cities their importance and was responsible for the cluster of identical artifacts of an administrative nature found in each site. According to the fourth-millennium tablets of Uruk Eanna, the scribes used to keep records of various kinds. There were reports of shepherds on the state of the flocks with which they were entrusted,[85] a possible explanation of the Nuzi envelope. By the nature of the goods accounted for and the quantities involved, the majority of the envelopes appear most similar to a large category of documents that were receipts of offerings.

The gifts delivered to the temple may have been, in early times, left to the discretion of the donors. One may assume that, as in the present Zaqa, strict and intricate rules developed which precisely dictated the nature of the offerings according to wealth,[86] and that social pressure was the main incentive for giving. There is indication, however, that in the fourth millennium B.C. the offerings had become imposed taxations.[87] The envelopes, which appear as a novelty in the late fourth millennium and have an official aspect, conferred by the presence of sealings, may well point out the time when the priesthood was invested with the power of enforcing the delivery of goods by sanctions. The notion of punishment is indeed explicit on the many sealings portraying bound prisoners. The system of taxation would necessitate strict control and the creation of a bureaucracy to carry it out. This step, which amounts to the regulation of the sources of production by a ruling class, is crucial in the socioeconomic development of a culture. It is viewed as the threshold between a tribal system and a chiefdom; in Fried's terms, between rank and stratified society.[88] The envelopes may therefore provide concrete evidence for the emergence of states, which is known to have occurred in Mesopotamia during the fourth millennium B.C. but for which precise dating has so far remained elusive.

[85]M. W. Green, "Animal Husbandry at Uruk in the Archaic Period" (paper delivered at the XXV Rencontre assyriologique, Berlin, 1978).

[86]Carleton S. Coon, *Caravan: The Story of the Middle East* (New York, 1966), pp. 109–10.

[87]Beale, p. 310.

[88]Morton H. Fried, *The Evolution of Political Society* (New York, 1967), p. 177.

The Steps to Writing

It was a great advantage to have the tokens expressing the records of transactions secured hermetically in envelopes. A major drawback, however, was that the tokens, once enclosed, became invisible and that any checking implied breaking the envelope and tampering with the sealings. It was probably to overcome this shortcoming that two techniques were developed to make the tokens readily visible at all times. The first technique consisted in attaching permanently to the outer surface of the envelope a set of tokens presumably identical to those enclosed (fig. 12). This was performed by sinking the tokens in the thickness of the envelope, a method evidenced by a single fragment from Susa showing two plain cylinders. The rarity of the sampling may suggest that the method had not been widely used, but it might also be considered as the trigger for a further elaboration of the

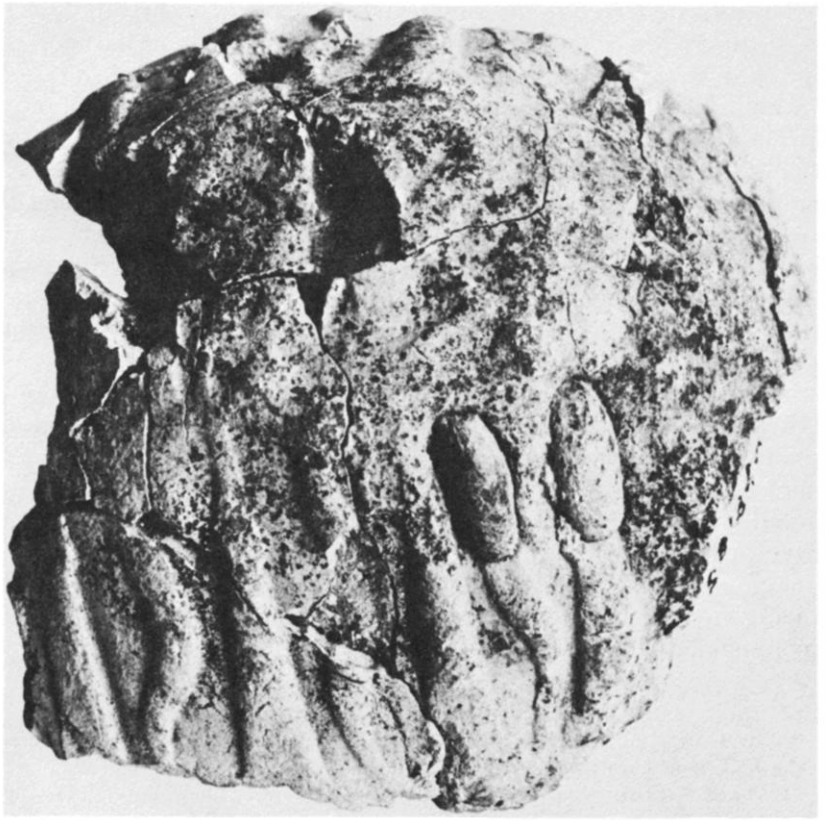

FIG. 12.—Fragments of an envelope bearing tokens attached to the surface, from Susa, Iran. (Courtesy of the Musée du Louvre, Département des antiquités orientales.)

system, which is no less than the invention of writing. Sixteen envelopes, including twelve in Susa, two in Habuba Kabira, one in Farukhabad, and one in Tepe Yahya bear markings.[89] Five of these specimens, found intact and recently opened, illustrate that the markings match both in number and shape the tokens held inside. The signs evidently were intended as memory aids and depicted the tokens kept within each envelope (fig. 1). Nine subtypes of tokens were represented in the seventeen envelopes bearing markings. They include spheres; discs; small and large cones, with one specimen bearing a punch mark; ovoids with a circular marking; cylinders; parabollae; and barrel shapes. Both the spheres and the discs were rendered by circular impressions. Examination of the markings shows that the two types of circular signs were easily distinguishable; the spheres were shown by a deep punch mark, while the discs were translated by a shallow one of the considerably larger diameter. The cones were either shown in profile or impressed tip first (fig. 1). It is interesting to note that the wedge marks that developed later to represent the cones are a combination of both methods. A large cone bearing a punch mark seems to be shown by impressing its base, thus forming a shallow circular marking of even greater diameter than that of a disc.[90] The incised ovoids were rendered by an oval impression with a small ridge corresponding to the incision showing on the token. The cylinders appear as long cylindrical markings. The signs corresponding to the parabollae and barrel-shaped tokens that were found in a fragmentary envelope are not identified.

The drawback of the impressed signs is immediately obvious: the units of accounts, which had very different shapes in the token system, became very similar when reduced to two dimensions. The markings are mainly divided into two broad categories of circles and wedges, which are confusing to us and were certainly also awkward in antiquity.

The technique of impressing the signs was in no way systematic. In Habuba Kabira, the tokens themselves were pressed into the soft clay before being enclosed in the envelope and still fit perfectly today in the cavity they left about 5,000 years ago. Some circular impressions standing for the discs seem to show the trace of fingernails and may have been impressed with a thumb.[91] The long markings expressing the cylinders seem to be made with a stick. At Tepe Yahya, the mark-

[89]Susa: Sb 1927, Sb 1940, Sb 2286, Sb 6350; S ACR 1.77.2089.1, 2111.3, 2130.1, 2130.2, 2142.2, 2142.3, 2162.1, 2173.4. Habuba Kabira: MII 133, MII 134.

[90]Le Brun and Vallat (n. 12 above), fig. 3:3.

[91]Sb 1940.

ings were scratched in when the clay of the envelope was already dry, rather than impressed.

The signs meant as a convenient improvement of the envelopes turned out to be a revolution in communication. It became obvious that the system of markings made the presence of the tokens superfluous, and tablets with impressed markings appeared (fig. 13). They conveyed the same information as the tokens but with greater efficiency, as their manufacture and handling were much simpler. The process from token to writing amounted to bringing the symbolism of the tokens to a second degree of abstraction by reducing the objects to a two-dimensional sign. The fact that only sixteen of the 200 known envelopes bear markings suggests that the transition between tokens and writing was rapid. Tablets with impressed signs seem in turn to represent no more than a quick second step in the development of writing. Such tablets are rare, although they have been found dispersed in a wide area of the Middle East, including Iraq, Syria, and Iran. Presently they are designated in the literature as "numerical tablets," implying that the impressed signs referred only to numbers.

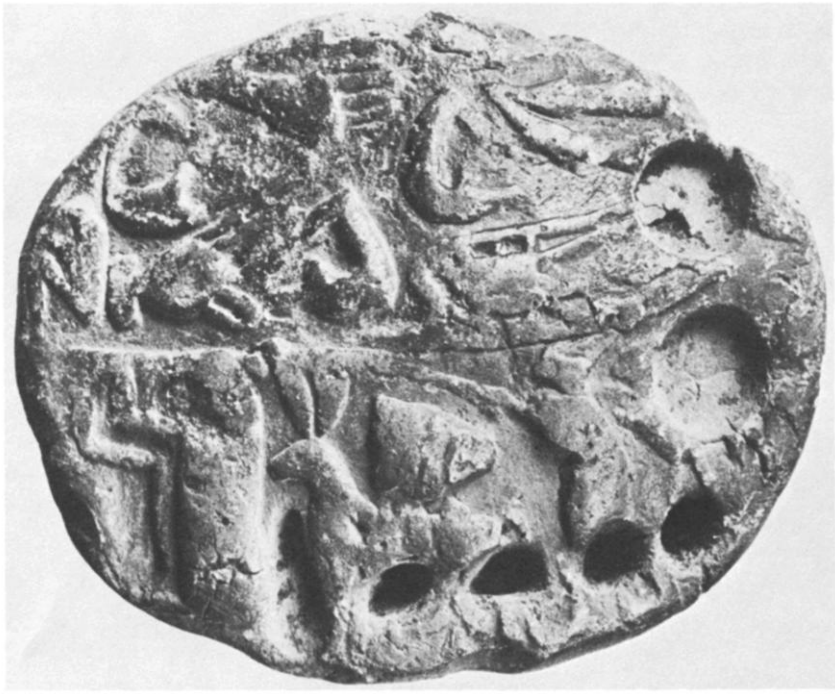

FIG. 13.—Impressed tablet from Susa, Iran. (Courtesy of the Musée du Louvre, Département des antiquités orientales.)

In the light of this paper, the signs standing for the tokens must have represented commodities of daily life. The drawback of the impressed signs was a lack of clarity, and they were soon replaced by more legible incised signs, which could express more accurately the outline of the tokens and the markings they bore.

Conclusion

About 200 spherical clay envelopes (including fragments) have been recovered in an area extending from Palestine to Iran, including Saudi Arabia. The seals impressed upon their surface indicate their formal character, and it seems clear that the tokens they contained stood for goods and stated liabilities. The envelopes would have remained of esoteric interest but for the discovery of their relationship to the invention of writing. Indeed, their evolution illustrates no less than the transition between an archaic abacus and writing according to the following sequence: (1) the invention of envelopes to hold tokens of specific transactions; (2) the impression of markings on the surface of the envelopes to indicate the shape and number of tokens included inside; (3) the collapse of the envelopes into clay balls or tablets bearing impressed signs; and (4) the elaboration of the impressed signs into incised pictographs.

The study of the envelopes therefore provides new insights into the origins of writing. It makes clear the process of its emergence from an archaic recording system based on tokens and throws light upon the fortuitous nature of its invention. It demonstrates that the cradle of writing was not confined to Mesopotamia but extended to the west as far as the upper Euphrates valley in Syria and to Elam at the east. The date of the events can be pinpointed to the Uruk IV period of 3200–3100 B.C.

In the light of this paper, it is no longer acceptable to believe that the Sumerians brought writing from a still unlocated ancestral homeland.[92] It remains true, however, that the Sumerian civilization was preponderant during this period in the entire area involved and that the Sumerian bureaucracy must have been crucial in these developments, which were to bring profound changes to the human condition.

[92]David Diringer, *The Alphabet* (London 1968), p. 17.